

REMARKS

The applicant again thanks the examiner for his review of the prior art and analysis of the pending claims and requests reconsideration of the pending claims. Kindly note that the applicants have changed their attorneys to the undersigned.

In summary, the most recent office action rejected the pending claims on the following grounds:

- 1) Insufficient antecedent basis,
- 2) As anticipated by U.S. patent 4,627,887 (Sachs),
- 3) As anticipated by U.S. patent 5,902,395 (Nagai), and
- 4) As obvious in view of Sachs alone and in view of US patent 4,627,887 (Little).

The applicant addresses these grounds for rejection below.

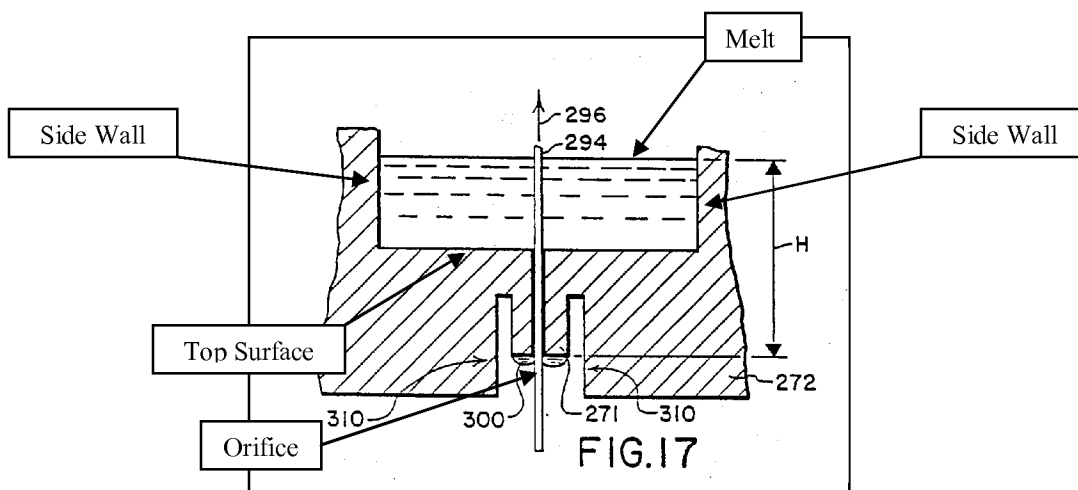
1) Antecedent Basis

The applicant has amended claims 19 and 67 to conform with the second paragraph of 35 U.S.C. § 112. The amended claims have sufficient antecedent basis.

2) Anticipation by Sachs

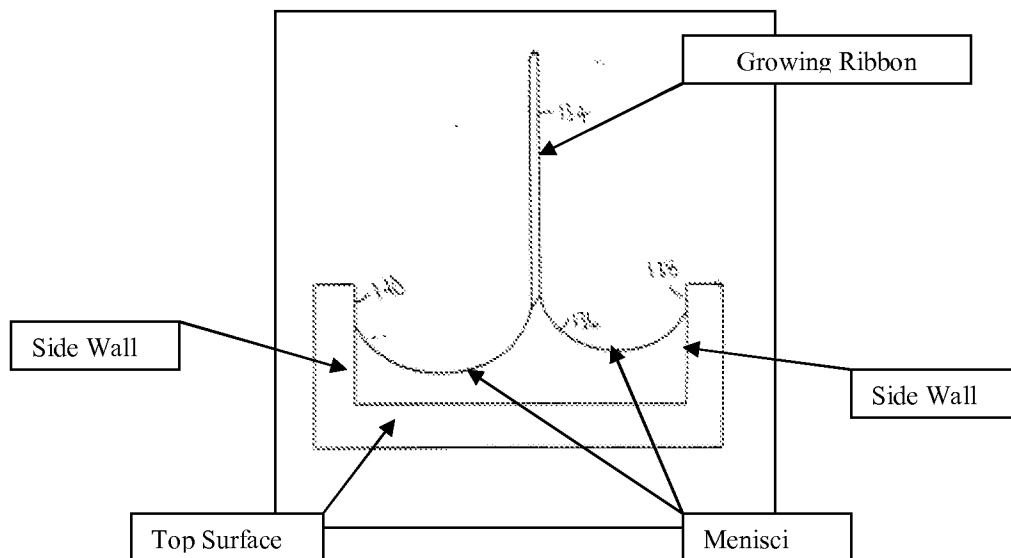
Claim 11 is directed to an apparatus for forming crystalline ribbon. The claim requires a crucible with a top surface that supports “substantially all of a source material” for forming ribbon. As amended, the claim also requires that the opposing edges of the crucible are “formed to retain substantially all of the melt by capillary attachment to the top surface of the crucible.” The claim is amended to reflect the inherent nature of the edges in retaining the melt by capillary attachment.

Sachs teaches a crucible with a top surface and sidewalls extending upwardly from the top surface. *See below Fig. 17.* The top surface of the crucible and the side walls act like a container by supporting and retaining substantially all of the melt.



To the contrary, the invention of claim 1 does not act like a container because the claim requires that the edges be formed to retain substantially all of the melt by capillary attachment. Although Sachs may have some capillary attachment at small portions of the sidewalls, the capillary attachment is not retaining “substantially all of the melt.” Instead, the side walls retain substantially all of the melt by a counteractive mechanical force between the melt and the side walls.

Because of this distinction, Sachs does not solve the problem solved by the invention defined by claim 1. Specifically, Sachs creates a melt surface with menisci between the growing ribbon and the side walls. *See Fig. below.*



The menisci have a destabilizing effect on the ribbon, and as the ribbon moves off center, the menisci heights change and distort ribbon growth. (*e.g.*, see application, page 15, lines 19-27, page 16, lines 10-12). Claim 1 solves this problem by creating a melt surface with a convex-up profile which has a stabilizing effect on the growing ribbon. (*e.g.* see application, page 17, lines 11-12, 22-27, Fig. 7).

Moreover, claim 11 requires that “opposing edges of the top surface” retain the melt by capillary attraction. In contrast, Sachs teaches retention by capillary attraction at a centered “orifice in the crucible bottom,” and therefore, does not teach the limitations of the claim. See Fig. 17 above, and col. 15, lines 15-16, 43-45. There is no suggestion or teaching in the prior art of a crucible with edges “formed to retain substantially all of the melt by capillary attachment.”

Thus, claim 11 is allowable over Sachs. In a similar manner, claims 59, 68-71, and 73 define a similar crucible and, thus, are allowable for the same reasons. Claims 12-16, 18, 19, 21, 22, 72, and 74 depend from claims 1 or 71 and, thus, are allowable for the same reasons.

3) Anticipation by Nagai

Claim 65 defines an apparatus for replenishing a melt source. The claim requires a feeder that is “movable in a first direction and a second direction along the crucible.” Nagai teaches a feeder that moves upwardly at an angle from the crucible. *Fig. 7I, col. 12, lines 61-63*. However, at most, Nagai’s feeder creates movement in one direction along the crucible. Upward movement from the crucible is relative to the crucible, but is not along the crucible. Claim 65 requires movement in two directions along the crucible, and thus, Nagai does not teach the limitations of the claim.

4) Obviousness

Claims 17 and 20 depend from claim 11 and are allowable for the same reasons. Claim 59 requires the crucible of claim 11 and is allowable for the same reasons as claim 11.

The applicants request issuance of a notice of allowance. To further expedite prosecution, the applicants request that the examiner call Jakub Michna at 617-443-9292 if he has any further questions. If additional fees are required, please charge deposit account number 19-4972.

Respectfully submitted,

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